

CLAIMS

1. A perpendicular magnetic recording medium made by sequentially stacking at least an underlayer, a magnetic 5 recording layer, a protective layer and a lubricant layer on a nonmagnetic substrate,

characterized in that said underlayer is composed from at least one element selected from Ru, Rh, Os, Ir and Pt,

10 said magnetic recording layer contains at least Co, Pt, Cr and B and at least one of an oxide and a nitride, and

15 the composition of said magnetic recording layer is such that the amount of Cr is 2 atom% or more and 12 atom% or less and the amount of B is 0.5 atom% or more and 5 atom% or less based on the total amount of Co, Pt, Cr and B, and the total amount of said oxide and nitride is 4 mol% or more and 12 mol% or less of the amount of said magnetic recording layer.

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2. The perpendicular magnetic recording medium according to claim 1, characterized in that said magnetic recording layer has a structure in which a nonmagnetic crystal particle boundary composed from at least one of 25 said oxide and nitride surrounds crystal particles composed from Co, Pt, Cr and B which have a crystalline

structure of hexagonal closest packing and are ferromagnetic.

3. The perpendicular magnetic recording medium
5 according to claim 2, characterized in that crystal
particles forming said magnetic recording layer are
epitaxially grown on crystal particles of said
underlayer.

10 4. The perpendicular magnetic recording medium
according to any of claims 1 to 3, characterized in that
said oxide or nitride is an oxide or a nitride of at least
one element of Cr, Al, Ti, Si, Ta, Hf, Zr, Y and Ce.

15 5. The perpendicular magnetic recording medium
according to any of claims 1 to 4, characterized in that
a seed layer is further provided immediately below said
underlayer.

20 6. The perpendicular magnetic recording medium
according to any of claims 1 to 5, characterized in that
a soft magnetic backing layer is further provided between
said nonmagnetic substrate and said underlayer.

25 7. A method for production of a perpendicular magnetic
recording medium made by sequentially stacking at least

an underlayer, a magnetic recording layer, a protective layer and a lubricant layer on a nonmagnetic substrate,

characterized in that said underlayer is formed by a sputtering process using a target composed from at least

5 one element selected from Ru, Rh, Os, Ir and Pt, and

said magnetic recording layer is formed by a sputtering process using a target containing at least Co, Pt, Cr and B and at least one of an oxide and a nitride, and having a composition such that the amount of Cr is

10 2 atom% or more and 12 atom% or less and the amount of B is 0.5 atom% or more and 5 atom% or less based on the total amount of Co, Pt, Cr and B, and the total amount of said oxide and nitride is 4 mol% or more and 12 mol% or less of the amount of said magnetic recording layer.

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8. A magnetic recording apparatus having a perpendicular magnetic recording medium made by sequentially stacking at least an underlayer, a magnetic recording layer, a protective layer and a lubricant layer

20 on a nonmagnetic substrate,

characterized in that said underlayer is composed from at least one element selected from Ru, Rh, Os, Ir and Pt,

25 said magnetic recording layer contains at least Co, Pt, Cr and B and at least one of an oxide and a nitride, and

the composition of said magnetic recording layer is such that the amount of Cr is 2 atom% or more and 12 atom% or less and the amount of B is 0.5 atom% or more and 5 atom% or less based on the total amount of Co, Pt, Cr and B, and the total amount of said oxide and nitride is 4 mol% or more and 12 mol% or less of the amount of said magnetic recording layer.